

Amendment After Final Rejection
Serial No. 10/046,633

Docket No. NL010037

REMARKS

Entry of this Amendment and reconsideration are respectfully requested in view of the amendments made to the claims and for the remarks made herein.

Claims 1-29 are pending. Claims 1-3, and 8-25 stand rejected. Claims 4-7 and 26-29 are objected to for being dependent upon a rejected base claim but would be allowable if rewritten in independent form.

Claims 1, 5-9, 11, 12, 14, 15, 17, 18, 20, 23, and 26-29 have been amended. Claims 3, 10, 13, 16, 19, 22, and 25 have been cancelled.

Claims 1-3, and 25 stand rejected under 35 USC 103(a) as being unpatentable over Brink (USP no. 6,662,337) in view of Alamouti (USP no. 5,931,965).

Applicant respectfully disagrees with, and explicitly traverses, the reason for rejecting the claims. However, in the interest of advancing the prosecution of this matter, the independent claims have been amended to more clearly state the invention in that the signal constellation "satisfies the criteria: $D_a > D_r$, and the average Hamming distance (H_l) between all pairs of labels corresponding to neighboring signal points has a substantially minimum value." No new matter has been added.

Support for the amendment may be found in the written description on at least page 8, lines 16-20, which state "[i]n some cases, joint optimization of the first criterion (i.e., having a D_r which is as big as possible but at least larger than D_l) and the second criterion (i.e., having a substantially minimum H_l) yields a set of solutions and some of them have different H_l for some $l > 1$." Although, the subject matter of dependent claim 3 was rejected, it will be shown that contrary to the statements made in the Office Action, the subject matter claimed in claim 3 is not rendered obvious by the cited references.

Brink, as read by applicant, discloses a transmission system in which a multilevel modulated signal is transmitted. The soft output information of a decoder is fed back and utilized by a soft demapping device in order to improve the decoding result by further iterative decoding steps. Brink discloses mapping of bits to symbols in Figures 5, 6 and 7. However, Brink fails to teach or suggest, which the Office Action acknowledges (see page 2, section 2), that the $D_a > D_r$.

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Alamouti, as understood by applicant, discloses a method of "trellis encoding signals mapped according to any signal constellation format [that] involves constructing an encoder output table and a state transition table. The encoder output table defines the output symbol of an encoder, given the input symbol and the present state of the encoder, while the state transition table defines the next state of the encoder given the present state of the encoder and the input applied to the encoder." Alamouti teaches the use of Hamming Distance measurement in hard decoding and Euclidean distance measurement with regarding soft decoding. More specifically, Alamouti teaches that "Hamming distance is defined as the number of bits which two binary sequences differ... Based upon a Hamming distance evaluation of the possible paths, the probability that a given path has generated a detected data sequence can be determined as follows." (see col. 9, lines 55-col. 10, lines 14.) And "[a]nother measure of the probability that a given path has generated a binary sequence is based upon Euclidean distance. Euclidean distance is the length of a straight line between points on a signal constellation. In general, probability measure based upon Euclidean distances exhibit better accuracy than probability measure based upon Hamming distance." (see col. 10, lines 15-21). Hence, Alamouti provides background information regarding Hamming distance and Euclidean distance and provides no further discussion regarding these measures or their use.

The instant Office Action (section 2, page 3) refers to Figure 1B of the Alamouti reference as an example of a constellation mapping of a star 16-QAM system that satisfies the criteria recited in the claims. The Office Action states that "the minimum distance between points is $[\text{SQRT}(2.5) - 2]$, or approximately 0.5811. The minimum distance between points whose labels differ by one position is 1 and, hence, the constellation shown in Figure 1B satisfies the criterion $D_a > D_r$." However, no details are provided in the Office Action to show how this determination was made.

Notwithstanding the statements made in the Office Action, Alamouti fails to teach or suggest that the mapping constellation satisfies the criteria $D_a > D_r$ and the average Hamming distance (H_1) between all pairs of labels corresponding to neighboring signal points has a substantially minimum value, as is recited in the claims. Rather, Alamouti merely provides examples of mapping constellations without any teaching or disclosure regarding the characteristics of the constellations illustrated in Figures 1A or 1B.

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A claimed invention is prima facie obvious when three basic criteria are met. First, there must be some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings therein. Second, there must be a reasonable expectation of success. And, third, the prior art reference or combined references must teach or suggest all the claim limitations.

In this case, Brink teaches a system in which a multilevel modulated signal is transmitted. Alamouti, teaches a trellis encoding system using multilevel mapping. However, neither Brink nor Alamouti, individually or in combination teach or suggest selecting mapping constellations satisfying the criteria $D_s > D_f$ and the average Hamming distance (H_1) between all pairs of labels corresponding to neighboring signal points has a substantially minimum value.

Even if it were possible to combine the teachings of Brink and Alamouti, the combined device does not render obvious the invention claimed, as the combination fails to teach or suggest all the elements claimed. More specifically, the combined device fails to teach or suggest selection of mapping constellations satisfying the criteria $D_s > D_f$ and the average Hamming distance (H_1) between all pairs of labels corresponding to neighboring signal points has a substantially minimum value.

Having shown that there is no teaching or suggestion to combine the references cited or that if the teachings were combined, the combined device would not include all the elements claimed, applicant submits that the reason for the rejections of claim 1 has been overcome and the rejection can no longer be sustained. Applicant respectfully requests withdrawal of the rejection and allowance of the claims.

In the matter of obviousness there is a great emphasis placed on "the importance of the motivation to combine." Yamanouchi Pharmaceutical Co. v. Danbury Pharmacal, Inc. 231 F. 3d. 1339, 56 USPQ2d. 1641, 1644 (Fed. Cir. 2000). More specifically, in the matter of obviousness, this court has found that:

an examiner ... may often find every element of a claimed invention in the prior art. If identification of each claimed element of the prior art was sufficient to negate patentability, very few patents would ever issue.

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Furthermore rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner ... to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention ... To counter this potential weakness in the obviousness construct, the suggestion to combine requirements stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness. *id.* quoting *In re Rouffet*, 149 F.3d 1350, 1357-58, 47 USPQ 2d 1453, 1457 (Fed. Cir. 1998)

Rather than finding motivation to incorporate mapping constellations satisfying the recited criteria in the device of Brink, it is believed that an impermissible use of the teachings of the instant application have been used as a blueprint to combine the teachings of the cited references without any suggestion or reason for such a combination.

For at least this reason, also, applicant believes that the reason for the rejection has been overcome and respectfully requests that the rejection be withdrawn.

With regard to the remaining independent claims, these claims recite subject matter similar to that recited in claim 1 and were rejected citing the same references used in rejecting claim 1. Thus, for the amendments made to the claims, which are similar to those made to claim 1, and for the remarks made in response to the rejection of claim 1, which are applicable in response to the rejection of the independent claims and reasserted, as if in full, in response to the rejection of the remaining independent claims, it is respectfully submitted that the reason for the rejection of these claims has been overcome and the rejection can no longer be sustained. It is respectfully requested that the rejection be withdrawn and the claims allowed.

With regard to the remaining claims, these claims ultimately depend from the independent claims, which have been shown to be allowable over the cited references. Accordingly, the remaining claims are also allowable by virtue of their dependence from an allowable base claim.

Applicant wishes to thank the examiner for the indication of allowable subject matter in claims 4-7 and 26-29. However for the amendments made to the claims and for

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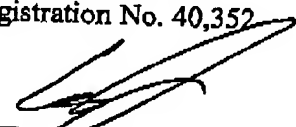
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the remarks made herein applicant submits that all the claims are in an allowable form and elects not to amend the claims as suggested.

Although the last Office Action was made final, this amendment should be entered. No matter has been added to the claims that would require comparison with the prior art or any further review. Accordingly, pursuant to MPEP 714.13, the amendments made should only require a cursory review by the examiner. The Amendment therefore should be entered without requiring a showing under 37 CFR 1.116(b).

For all the foregoing reasons, it is respectfully submitted that all the present claims are patentable in view of the cited references. A Notice of Allowance is respectfully requested.

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